

## *Cercaria chilkaensis* II, a New Zoogonid Cercaria from the Snail, *Nassarius orissaensis*, from Chilka Lake, India

R. MADHAVI AND U. SHAMEEM

Department of Zoology, Andhra University, Waltair, India

**ABSTRACT:** A new zoogonid cercaria, *Cercaria chilkaensis* II sp. n., from the snail, *Nassarius orissaensis* (Preston), from Chilka Lake, a brackish water habitat in India, is described. Comparison of its characteristics with those of the 7 previously described zoogonid cercariae indicates the closest resemblance to the cercaria of *Diphtherostomum brusinae* Stossich, 1904.

**KEY WORDS:** *Cercaria chilkaensis* II sp. n., Chilka Lake, Zoogonidae, cercaria, *Nassarius orissaensis*, India.

Larval stages of the family Zoogonidae have so far not been reported from the Indian Ocean area, although adult zoogonids are known from marine fishes of the Bay of Bengal (Madhavi, 1979). The present report provides a description of a new zoogonid cercaria, *Cercaria chilkaensis* II, from the prosobranch snail, *Nassarius orissaensis* (Preston), collected from Chilka Lake, a brackish water habitat in Orissa state, India. *C. chilkaensis* I was described as a new cystophorous cercaria from the same locality (Shameem et al., 1990).

### Materials and Methods

Monthly samples of *N. orissaensis* were collected from Chilka Lake and examined for larval trematode infections. The snails were isolated individually in petri dishes containing diluted seawater and examined on the following day for the presence of cercarial infections.

Details of cercariae were studied by examining live, freshly liberated cercariae mounted on a slide. Neutral red was used as a vital stain. Measurements were taken from cercariae killed in nearly boiling seawater of salinity 10‰ and mounted freely floating under a coverglass. Measurements, given in micrometers, are based on 8 specimens and specify the range and mean, the latter given in parentheses. The figure was drawn with the help of a camera lucida from a heat killed cercaria and details were added freehand.

### Results

Infection with the zoogonid cercaria was found only once during August 1986 when 1 of 30 snails emitted tailless cercariae. Salinity of the lake at that time was 5‰. None of the 200 snails examined during the period April 1986 to July 1986 was infected. The cercariae emerged from the snail during daytime, and were found firmly adhering to the bottom of the glass container by their sticky posterior ends. They were very active

and remained alive for 48 hr at room temperature in water of 10‰ salinity.

### *Cercaria chilkaensis* II sp. n. (Fig. 1)

**DESCRIPTION:** Cercariaeum, body oval, 280–300 (290) long, 80–100 (90) wide. Tegument thick with large, thornlike, retrorse spines. Suckers well developed, oral sucker terminal, 56–60 × 42–44 in size, with small triangular stylet 10–12 (11) long. Ventral sucker posterior to midlevel of body, protrusible 56–60 (58) in diameter. Prepharynx short, pharynx 36–40 × 20–24 in size, esophagus narrow, 48–50 long, gut bifurcating anterior to ventral sucker, ceca terminating at midlevel of hindbody. Six penetration glands in 2 groups of 3 each located near intestinal bifurcation, each gland irregular in shape with prominent nucleus and fine granular cytoplasm, staining deeply with neutral red. Penetration gland ducts in 2 narrow bundles, opening through pores situated on either side of stylet. Excretory bladder globular, with sphincter adjacent to excretory pore, bladder wall cells if present, indistinct. Two pairs of main excretory tubules enter bladder anterolaterally. Flame cell formula  $2[(2 + 2) + (2 + 2)] = 16$ . Two genital primordia present, 1 anterior to and another posterior to ventral sucker. Body containing abundant refringent granules, rendering body opaque.

**HOST:** *Nassarius orissaensis*.

**LOCALITY:** Chilka Lake.

**PREVALENCE:** 3.3% in August 1986.

**SPECIMENS DEPOSITED:** Zoological Survey of India, Calcutta accession number W1/7756.

### Discussion

The cercaria here described is the eighth species of larval zoogonids reported worldwide (Table 1). It most closely resembles the cercaria of

Table 1. List of reported zoogonid cercariae with their hosts and localities.

Cercaria	Hosts	Locality	Authority	Name employed
<i>Zoogonius rubellus</i> (Olsson, 1868)	<i>Nassarius reticulatus</i>	Roscoff, France	Stunkard, 1932	<i>Cercariaeum reticulatum</i>
Odmer, 1902	<i>Nassarius reticulatus</i>	Roscoff, France	Stunkard, 1941	as <i>Z. rubellus</i>
<i>Zoogonius lastus</i> (Leidy, 1891) Stunkard, 1940	<i>Ilyanassa mutabilis</i>	New Jersey, USA	Leidy, 1891	<i>Distonium lastum</i>
	<i>Ilyanassa mutabilis</i>	Massachusetts, USA	Linton, 1915	<i>Cercaria</i> sp.
	<i>Ilyanassa mutabilis</i>	Massachusetts, USA	Miller and Northup, 1926	<i>Cercariaeum lintoni</i>
	<i>Ilyanassa mutabilis</i>	New York, USA	Africa, 1930	<i>Cercariaeum lintoni</i>
	<i>Ilyanassa mutabilis</i>	California, USA	Glading, 1935	<i>Cercariaeum lintoni</i>
	<i>Ilyanassa mutabilis</i>	Massachusetts, USA	Stunkard, 1940	<i>Z. lastus</i> (Leidy, 1891)
<i>Zoogonoides viviparus</i> (Olsson, 1868)	<i>Buccinum undatum</i>	Boulogne, France	Peleneer, 1906	<i>Cercaria giardi</i>
Odmer, 1902	<i>Buccinum undatum</i>	Northumberland, UK	Lebour, 1911	<i>Cercaria buccini</i>
	<i>Buccinum undatum</i>	Northumberland, UK	Lebour, 1918	<i>Z. viviparus</i>
	<i>Buccinum undatum</i>	Denmark	Koie, 1971, 1976	<i>Z. viviparus</i>
<i>Diptherostomum brustinae</i>	<i>Nassarius reticulatus</i>	Black Sea	Sinitzin, 1911	<i>C. inconstans</i>
Stossich, 1904	<i>Nassarius reticulatus</i>	Black Sea	Dolgikh, 1970	<i>D. brustinae</i>
	<i>Nassarius reticulatus</i>	Naples, Italy	Palombi, 1930, 1934	<i>D. brustinae</i>
	<i>Nassa mutabilis</i>	Banyuls, France	Bayssade-Dufour and Maillard, 1974	<i>D. brustinae</i>
<i>Cercaria crispata</i> Peleneer, 1906	<i>Natica alderi</i> (= <i>N. poliana</i> )	Boulogne, France	Peleneer, 1906	<i>C. crispata</i>
<i>Zoogonoides laevis</i> Linton, 1940	<i>Murella lunata</i>	Massachusetts, USA	Stunkard, 1943	<i>Z. laevis</i>
<i>Cercaria brachycaeca</i> Shimura and Ito, 1980	<i>Batillia cornutus</i>	Japan	Shimura and Ito, 1980	<i>C. brachycaeca</i>
<i>Cercaria chilkaensis</i> II	<i>Nassarius orissaensis</i>	Orissa, India	Present report	<i>C. chilkaensis</i> II n. sp.

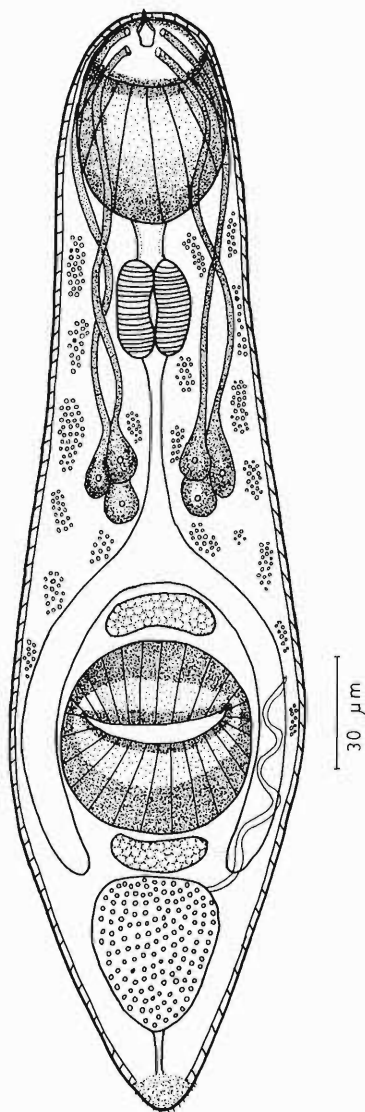


Figure 1. *Cercaria chilkaensis* II sp. n. from the snail, *Nassarius orissaensis*, ventral view.

*D. brusinae*, especially in having 3 pairs of penetration glands. The number is much higher in the remaining species; there are 6–8 pairs of penetration glands in the cercariae of *Z. rubellus* and *Z. laevis*, the former of which has well organized rudiments of testes and ovary. The cercaria of *Z. viviparus* has numerous penetration glands, and the posterior part of the body forms a prominent disc covered with spines. In *Cercaria brachycaeca* described by Shimura and Ito (1980) there are 6 pairs of penetration glands, and ceca

are short and stout, terminating in the equatorial plane of the body.

The above comparison suggests that the present form may represent a species congeneric with *D. brusinae*. Adults of such a species occur in the cat fish, *Tachysurus thalassinus*, from the lake where infected snails were collected, and metacercarial cysts referable to the genus *Diphtherostomum* were found attached to the mantle fold of *N. orissaensis*. Experimental work is needed to link the various stages in the life cycle.

#### Acknowledgments

We thank the Indian Council of Agricultural Research for providing funds to complete this work.

#### Literature Cited

- Africa, C. M. 1930. The excretory system of *Cercariaeum lintoni* Miller, 1926. *Journal of Parasitology* 17:14–17.
- Bayssade-Dufour C., and C. Maillard. 1974. Che-  
totaxie de quatre cercaires d'Allocreadioidea.  
*Annales de parasitologie Humaine et Comparée* 49:  
521–554.
- Dolgikh, A. V. 1970. Trematode larvae, parasites of  
Black Sea mollusc *Nassa reticulata* var. pontica.  
Pages 122–138 in "Bentos." "Naukova DUMKA,"  
Kiev, U.S.S.R. (1965).
- Glading, B. 1935. The life cycle of *Cercariaeum lin-  
toni* Miller and Northup. *Journal of Parasitology*  
21:434.
- Koie, M. 1971. On the histochemistry and ultrastruc-  
ture of the tegument and associated structures of  
the cercaria of *Zoogonoides viviparus* in the first  
intermediate host. *Ophelia* 9:165–206.
- . 1976. On the morphology and life history of  
*Zoogonoides viviparus* (Olsson, 1868) Odhner, 1902  
(Trematoda, Zoogonidae). *Ophelia* 15:1–14.
- Lebour, M. V. 1911. A review of the British marine  
cercariae. *Parasitology* 4:416–456.
- . 1918. A trematode larva from *Buccinum un-  
datum* and notes on trematodes from post-larval  
fish. *Journal of the Marine Biological Association*,  
U.K. 11:514–517.
- Leidy, J. 1891. Notices of Entozoa. *Proceedings of  
Academy National Sciences, Philadelphia* 42:410–  
418.
- Linton, E. 1915. Note on trematode sporocysts and  
cercariae in marine molluscs of the Woods Hole  
region. *Biological Bulletin* 28:198–209.
- Madhavi, R. 1979. Digenetic trematodes from ma-  
rine fishes of Waltair coast, Bay of Bengal. Family  
Zoogonidae. *Rivista di Parassitologia* 40:249–259.
- Miller, H. M., and F. E. Northup. 1926. The seasonal  
infestation of *Nassa obsoleta* (Say) with larval  
trematodes. *Biological Bulletin* 50:490–508.
- Palombi, A. 1930. Il ciclo biologico di *Diphtherosto-  
mum brusinae* Stossich (Trematode digenetic:  
fam. Zoogonidae Odhner). *Pubblicazione della  
Stazione Zoologica di Napoli* 10:111–149.

- . 1934. Gli stadi larvali dei trematodi del Golfo di Napoli. I. Contributo allo studio della morfologia, biologia e sistematica della cercarie marine. Pubblicazione della Stazione Zoologica di Napoli 14:51–94.
- Pelseneer, P.** 1906. Trématodes parasites de mollusques marins. Bulletin Scientifique de la France et de la Belgique 40:161–186.
- Shameem, U., N. Narasimha Rao, and R. Madhavi.** 1990. *Cercaria chilkaensis* No.1 a new cytophorous cercaria from the snail, *Stenothyra blanfordiana* from Chilka lake, India. Journal of Natural History 24:261–270.
- Shimura, S., and J. Ito.** 1980. Two new cercariae, *Cercaria brachycaeca* n. sp. and *Cercaria misakiana* n. sp. from top shells, *Batillus cornutus* and *Marmarostoma stenogyrum*, with notes of their effects on the hosts. Japanese Journal of Parasitology 29:69–76.
- Sinitzin, D.** 1911. Parthenogenetic generation of trematodes and its progeny in molluscs of the Black Sea. (Translation.) Records of the Imperial Academy of Sciences, St. Petersburg 30:127 pp.
- Stunkard, H. W.** 1932. Some larval trematodes from the coast in the region of Roscoff. Finistère. Parasitology 24:321–343.
- . 1940. Life history studies and specific determination in the trematode genus *Zoogonus*. Journal of Parasitology 26(Suppl.):33–34.
- . 1941. Specificity and host-relations in the trematode genus *Zoogonus*. Biological Bulletin 81: 205–214.
- . 1943. The morphology and life history of the digenetic trematode, *Zoogonoides laevis* Linton, 1940. Biological Bulletin 85:227–237.

## Scientist of the Year

### From the Director, United States Department of Agriculture, Agricultural Research Services

Jitender P. Dubey, Research Microbiologist, Zoonotic Diseases Laboratory, Livestock & Poultry Sciences Institute, has been selected as the Beltsville Area Scientist of the Year for 1990. Dr. Dubey has distinguished himself as a leader in parasitology research nationally and internationally. He is especially well known for his research on *Toxoplasma*, a protozoan parasite that infects many domestic animals, cattle, swine, sheep, goats, and horses, resulting in disease and substantial economic losses. He has documented the complex life cycle of the parasite, studied its epidemiology in livestock, and developed methods for rendering meat products noninfectious from the standpoint of public health.

Dr. Dubey's research extends broadly beyond his contributions on toxoplasmosis. For example, he recently discovered a new genus of parasites (*Neospora*) of potentially great economic importance. He has developed a diagnostic test to detect infections in animals and man and is assisting the State of California in diagnosing an outbreak in dairy cattle.

Dr. Dubey received a Ph.D. from the School of Medicine, University of Sheffield, England, in 1966. He worked at Montana State University prior to joining ARS at Beltsville in 1982. His research is documented in over 350 publications. Dr. Dubey has received a number of prestigious awards, including the Distinguished Veterinary Parasitologist Award from the American Association of Veterinary Parasitology.